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September 9, 2002

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ORIGINAL

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
The Portals
445 Twelfth Street, S.W.
Washington, DC 20554

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FEDERAL COMMUNICATIONS COMMISSION
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Re: ***Ex Parte Presentation***:
IB Docket No. 01-185;
Motient Services Inc. and Mobile Satellite Ventures Subsidiary LLC;
File No. SAT-ASG-20010302-00017 et al.;
TMI Communications and Company, Limited Partnership
File No. SES-ASG-20010116-00099 et al.

Dear Ms. Dortch:

On behalf of Inmarsat Ventures plc, enclosed is "Inmarsat's Reply to the 'Further Technical Analysis' of Mobile Satellite Ventures, dated July 29, 2002."

An original and five copies are enclosed.

Respectfully submitted,

John P. Janka

Enclosures

cc (w/ encl.):

Rick Engelman
Breck Blalock
Trey Hanbury
Paul Locke

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Inmarsat's Reply to the "Further Technical Analysis" of Mobile Satellite Ventures, dated July 29, 2002

Inmarsat Ventures plc

September 9, 2002

IB Docket No. 01-185;
File No. SAT-ASG-20010302
-00017 *et al.*

REPLY OF INMARSAT TO THE FURTHER TECHNICAL ANALYSIS OF MOBILE SATELLITE VENTURES, DATED JULY 29, 2002

I. Introduction and Executive Summary.

In May 2002, Inmarsat Ventures plc submitted three detailed technical analyses in this proceeding that quantify one aspect of the harmful interference that would be generated by Mobile Satellite Venture's (MSV's) proposed L-band ATC system, rebut MSV's assertion that is it feasible for MSV to monitor and control that interference, and demonstrate that MSV's ATC system will consume more L-band spectrum than MSV needs for stand-alone MSS service:

(i) "Quantification of Harmful Co-Channel L-Band Uplink Interference into Inmarsat-4 From MSV ATC Uses, Versus MSV Mobile Earth Terminal Uses," filed May 10, 2002;

(ii) "Inmarsat Response to MSV *Ex Parte* of March 28 Concerning 'Monitoring and Control of Ancillary Terrestrial Emissions by MSV's Space Segment,'" filed May 15, 2002; and

(iii) "MSV is Unable to Operate ATC Without Using Additional Spectrum Beyond That Used for Its MSS System," filed May 21, 2002.

MSV submitted a terse "technical analysis" on July 29, 2002 entitled "Further Technical Analysis"[1] that attempts to respond to these three Inmarsat papers. Inmarsat hereby replies to MSV's "Further Technical Analysis."

Contrary to MSV's assertion, its July 29, 2002 ex parte paper does not, by any stretch of the imagination, "demonstrat[e] the errors in the Inmarsat ... analys[i]s."[2] MSV's submission simply resorts to blanket, white-washing statements about its fundamentally flawed ATC technical proposals, and to vague intimations about technologies that "MSV may deploy" or that "may evolve," but that MSV claims are too proprietary to describe in writing.

MSV again fails to provide any substantive support for its ATC technical proposal and fails dismally to address in any detail the inadequacies of that proposal, which Inmarsat has identified. In short, MSV's ex parte is a hollow document, lacking any new facts or arguments, that fails to rebut Inmarsat's detailed technical analyses.

In section I of its July 29 paper, MSV makes the following unsubstantiated claims:

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1 *Ex parte* presentation of Mobile Satellite Ventures Subsidiary LLC, IB Docket No. 01-185, File No. SAT-ASG-20010302-00017 *et al.*, Further Technical Analysis (filed July 29, 2002) (*"Further Technical Analysis"*).

2 *Id.* at 2.

1. "MSV's satellite system operations will continue to be the driver with any frequency coordination with Inmarsat."[3]

This is a baseless assertion by MSV, with absolutely no supporting evidence or rationale. Basically MSV is saying "Trust me – I will only ask for spectrum in the international frequency coordination process that I actually need to support an MSS-only system, and will totally disregard any ATC aspects of my system that (Inmarsat's analysis has shown) inevitably would lead to greater amounts of spectrum being required to provide ATC service."

2. "MSV's ancillary terrestrial traffic will transmit a negligible amount of energy capable of reaching Inmarsat's satellite antennas, both in absolute terms and relative to the energy transmitted by MSV's satellite traffic."[4]

Again there is no basis for this assertion. The word "negligible" suggests that Inmarsat would have no problem with the resulting aggregate interference from L-band ATC mobile transmitters, whereas in fact Inmarsat has clearly demonstrated that even a small number of such transmitters would produce harmful interference into the Inmarsat satellite uplinks. Inmarsat has also clearly shown that the aggregate interference from a small number of such transmitters would far exceed the levels of interference that ever would be produced by MSV's satellite traffic.

3. "We also provide further support for MSV's earlier explanations of its ability to reuse its spectrum for satellite operations and its ability to share spectrum between satellite and terrestrial operations, refuting Inmarsat's contentions to the contrary."[5]

No further support is provided in MSV's ex-parte submission. MSV simply re-asserts its previous claims that have been demonstrated by Inmarsat to be invalid. The proposed MSV ATC system simply would not be able to operate without additional L-band spectrum, over and above what MSV needs for its satellite-only MSS system.

4. "We also show that monitoring of potential interference to Inmarsat can be done effectively by MSV's satellites."[6]

MSV deals with this matter in detail in section IV of its ex parte, and all the points raised by MSV are fully addressed in section IV of this document.

II. The Potential for Sharing Satellite Spectrum Between MSV and Inmarsat.

In section II of the MSV ex parte submission, MSV does not even attempt to refute the Inmarsat analysis previously presented, which demonstrates why the overall frequency reuse in the proposed next-generation MSV satellite system will not exceed

[3] *Id.*

[4] *Id.*

[5] *Id.*

[6] *Id.*

10-fold in practice (as compared to the 28-fold initially claimed by MSV).[7] MSV does discuss hypothetical situations, which could theoretically produce higher than 28-fold frequency reuse, but provides no basis for the suggestion that this would be the level of frequency reuse it actually will achieve in practice with its North American MSS system as described in MSV's pending FCC replacement satellite application.[8] Thus, we can only assume that MSV accepts the conclusion of Inmarsat's analysis of likely traffic distribution on MSV's spacecraft,[9] which is important because a 10-fold frequency reuse factor bounds the level of interference that Inmarsat would receive from MSV's proposed satellite-only operations.

MSV instead tries to divert the argument from the frequency reuse of the MSV satellite system to the sidelobe performance of the Inmarsat satellite antennas. In so doing, MSV misinterprets the relevance of the 20 dB sidelobe level used by Inmarsat throughout this proceeding in analysing the potential interference from the proposed MSV ATC system. MSV further argues that "Inmarsat should be able to achieve at least 25 dB of antenna discrimination on Inmarsat-4 satellites used to provide service outside the United States."[10]

The following information should clarify any remaining questions regarding the actual satellite antenna sidelobe performance of the Inmarsat-4 spacecraft currently under construction and the relevance of the 20 dB sidelobe contour. The Inmarsat-4 satellites are being built with a 9 meter antenna using state-of-the-art technology and the sidelobe roll-off of this antenna is a direct result of this antenna design. The level of discrimination that any such antenna can provide toward a given part of the US is a function of how close the beam it produces operates to the US. Inmarsat-4 beams operating just outside the borders of the US have very little discrimination toward the US, whereas beams operating far away from the US have more than 30 dB discrimination toward the US. As Inmarsat has previously indicated, Inmarsat covers the oceans in order to serve maritime users at sea and aeronautical users flying over the oceans, and Inmarsat covers nations near the US in order to meet the need for land mobile and other services in those countries. [11] Consequently, Inmarsat can use over

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[7] "Quantification of Harmful Co-Channel L-Band Uplink Interference into Inmarsat-4 From MSV ATC Uses, Versus MSV Mobile Earth Terminal Uses," at Attachment, *ex parte* presentation of Inmarsat, IB Docket No. 01-185, File No. SAT-ASG-20010302-00017 *et al.* (filed May 10, 2002).

[8] MSV also reveals new plans for an L-band satellite to cover South America. *Further Technical Analysis* at 4. Contrary to what MSV believes however, the operation of such a satellite would not automatically reduce the likelihood of co-channel sharing with Inmarsat, since Inmarsat already operates over South America, and the frequencies used by a South American MSV satellite would first have to be obtained through the international frequency coordination process, which MSV has not participated in for the past three years.

[9] *See* "Quantification of Harmful Co-Channel L-Band Uplink Interference into Inmarsat-4 From MSV ATC Uses, Versus MSV Mobile Earth Terminal Uses," at Attachment, *ex parte* presentation of Inmarsat, IB Docket No. 01-185, File No. SAT-ASG-20010302-00017 *et al.* (filed May 10, 2002).

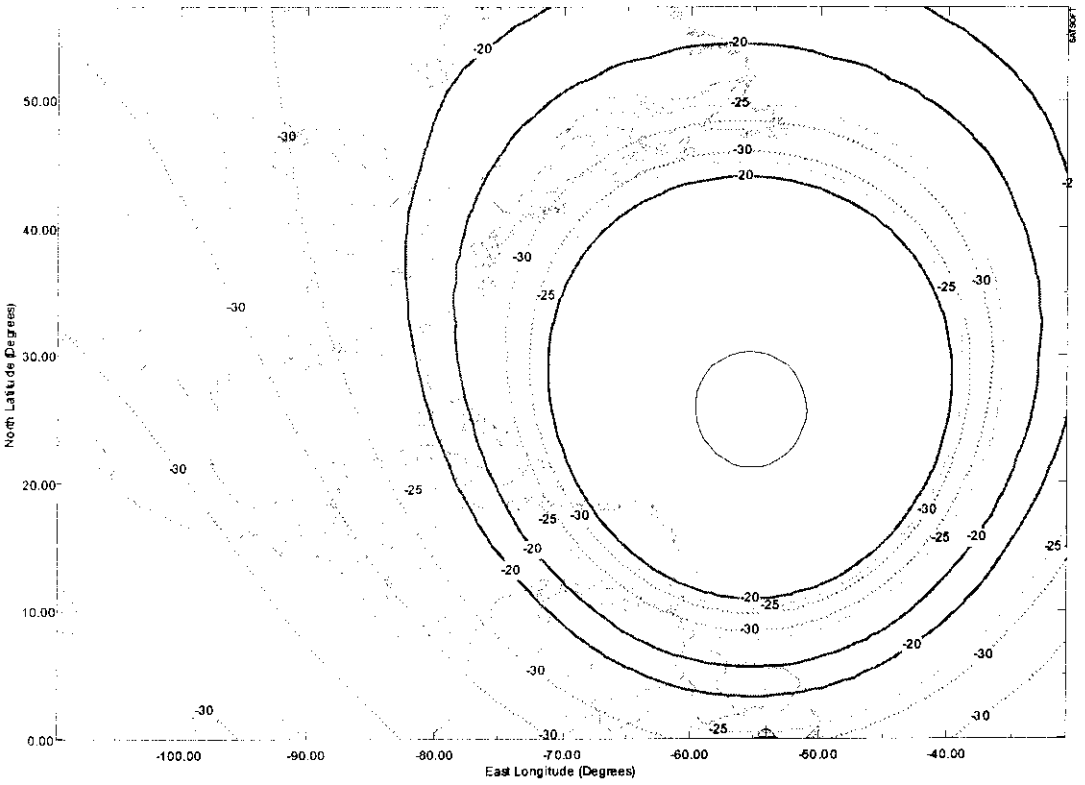
[10] *Further Technical Analysis* at 3.

[11] Inmarsat provides its aeronautical and maritime services, including safety-of-life and GMDSS communications, in the spot beams of Inmarsat-3 (and will provide them in the soon-to-be-launched Inmarsat-4) satellites covering the ocean regions and countries that are adjacent to the US.

the oceans and over nearby nations the very same frequencies that MSV wishes to use to provide ATC in the US.

The relationship of Inmarsat's –20 dB contour to possible ATC service areas can be clearly seen in Figure 1 below where a typical beam from an Inmarsat-4 spacecraft at 54° W.L. is providing service offshore in the Atlantic Ocean. This beam represents an example of an Inmarsat-4 spot beam, over the middle of the Atlantic Ocean, that would experience harmful interference from ATC in the US. This is one of the many spot beams on Inmarsat-4 that Inmarsat expects will be able to share spectrum with MSV on a co-channel basis, and that would be adversely affected by ATC deployment. The antenna sidelobe contours of this beam are shown based on a typical roll-off pattern. Large parts of the highly populated areas of the eastern USA, from Florida to the Great Lakes, fall above the –20 dB sidelobe level (solid lines) of this beam. Beyond this, the sidelobes fall to the –30 dB level providing greater discrimination toward the central and western parts of the US (for this beam and from this orbital location only).

Figure 1 - Example of Inmarsat-4 beam operating outside of the US



Therefore there would exist parts of the MSV ATC service area, including significant coastal and near-coastal metropolitan areas (where MSV has indicated that it intends to provide ATC service), that are on or above the –20 dB sidelobe of the Inmarsat-4 satellite antenna. A relatively small number of MSV ATC mobile transmitters

operating in these areas would be enough to cause harmful interference to the Inmarsat-4 satellite.[12]

Clearly there will be other areas of the US, well away from the eastern coastline and US borders, where the satellite antenna sidelobe level of a given Inmarsat-4 beam is much less than –20 dB (as low as -30 dB in the central and western parts of the US according to Figure 1 above) and the effects of the MSV ATC interference into this beam of an Inmarsat spacecraft over the Atlantic Ocean at 54° W.L. will be correspondingly less from these areas. However, these areas are not the limiting case for the ATC interference into that spacecraft, and other Inmarsat spacecraft, such as those operating over the Pacific Ocean (e.g., 142° W.L. or 178° E.L.), could be affected along the western part of the US in a manner similar to the way Inmarsat-4 at 54° W.L. would be affected as described above. Thus, those areas in the US where the satellite antenna sidelobe level for a given Inmarsat beam may be lower than -20 dB cannot be considered the basis for calculating the interference potential of ATC into the Inmarsat system.

MSV also states that "the use of the more realistic estimate [of 25 dB] for the antenna discrimination parameter would permit more sharing between MSV and Inmarsat."[13] This is really a suggestion that Inmarsat should only reuse spectrum very far away from the US, so that MSV can do what it wants terrestrially within US borders without harming Inmarsat. Without ATC use, it is feasible for Inmarsat to reuse L-band spectrum at much closer geographical separation to the MSV satellite beams, thereby increasing the efficient use of spectrum. That type of reuse is fully consistent with the terms and conditions of the Mexico City MOU, which was developed in order to maximize the reuse of L-band spectrum by satellite systems over North America. MSV's suggestion that Inmarsat-4 operations be limited such that any US territory it serves is outside of the -25 dB gain contour of an Inmarsat beam would severely and unnecessarily constrain the geographic areas that could be served by Inmarsat and therefore would constitute less spectrum sharing, not more.[14] This would impose an unwarranted constraint on the international L-band frequency coordination process and would reduce the amount of L-band spectrum available globally.

Moreover, MSV's line of argument essentially concedes Inmarsat's assertions that allowing the L-band to be used for terrestrial services that do not conform to the ITU Table of Frequency Allocations would both (i) cause interference into primary users of the L-band operating outside the U.S., and (ii) constrain Inmarsat's ability to

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[12] *See Technical Annex to Comments of Inmarsat Ventures plc*, IB Docket No. 01-185 (filed October 19, 2001); *Supplemental Technical Annex to Reply Comments of Inmarsat Ventures plc*, IB Docket No. 01-185 (filed November 13, 2001); *Ex parte* presentation of Inmarsat, IB Docket No. 01-185, File No. SAT-ASG-20010302-00017 *et al.* (filed February 26, 2002).

[13] *Further Technical Analysis* at 3.

[14] The beam shown in Figure 1 would have to be moved many hundreds of miles to the east in order to ensure that the US and its territories and protectorates do not fall within the –25 dB gain contour.

employ advances in satellite technology to increase spectrum sharing among satellite systems.[15]

MSV states that "unless the Inmarsat-4 spot beams can produce a discrimination of at least 25 dB ... Inmarsat-4 operations may become interference limited from Inmarsat's own (intra-system) frequency reuse."[16] MSV calculates in a footnote that the Inmarsat-4 intra-system C/I would be 15 dB with 25 dB discrimination and 10 times reuse.[17] MSV then asserts that with more than 10 times reuse, the C/I would become even smaller and may significantly impact system performance. But MSV is wrong in its simplistic way of calculating the aggregate intra-system interference in the Inmarsat-4 system. There will not be 10 identical co-frequency users all on the -25 dB gain contour in the Inmarsat-4 system. Since the co-frequency users on the Inmarsat system will be spread over a very wide geographic area, each co-frequency user will be at a different gain contour level , with a number of them below the –25 dB level (and some above -25 dB). The Inmarsat-4 satellite antenna is specifically designed to permit 8-10 times reuse, taking into account the statistical variation of traffic.

MSV is however correct that the intra-system interference issue is important in satellite system design. If we use MSV's own simplistic intra-system interference calculation methodology on MSV's own system we can in fact see that MSV's bold statements about the level of reuse in the MSV system are unsustainable. MSV has stated that it can achieve as high as 50 times frequency reuse within its proposed new satellite system. Using MSV's methodology, with 25 dB antenna discrimination and 50 times reuse, the MSV intra-system C/I would be 8 dB. Even with "only" 28 times reuse, the MSV intra-system C/I would be 10.5 dB. Clearly such low C/I levels would render MSV's own satellite system, in MSV's own words, "severely interference limited."[18] Thus, even though MSV's calculation methodology is too simplistic to provide a complete understanding of this performance aspect, these calculations show that the levels of reuse claimed by MSV would not be achievable in practice.

III. Absence of Spectrum Sharing Between MSV's Satellite System and Ancillary Terrestrial Component.

In section III of its paper, MSV tries to refute Inmarsat's analysis of May 21 that showed that it is not possible for MSV to operate its proposed ATC system without consuming more L-band spectrum than MSV needs for its satellite system.

Firstly, MSV claims that it has developed a method (patent pending) that will enable it to maintain an average of at least 10 dB antenna discrimination between its ATC stations and co-channel satellite beams.[19] Inmarsat has previously addressed MSV's

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[15] *See ex parte* presentation of Inmarsat, IB Docket No. 01-185, File No. SAT-ASG-20010302-00017 *et al.* (filed February 26, 2002) at 6 & 32.

[16] *Further Technical Analysis* at 4 & n.2.

[17] *Id.*

[18] *Id.*

[19] *Id.* at 6.

proposed use of the average -10 dB gain contour and explained that this cannot be the basis for demonstrating that the MSV ATC system is viable because there will be unacceptable interference from ATC transmissions that occur at higher gain contour levels.[20]

MSV has once again resorted to claiming that it has a confidential new technique at its disposal that it cannot disclose to the Commission or Inmarsat because of a pending patent application for that technique. Whenever Inmarsat, or others, has pointed out a fundamental failing in the proposed MSV ATC system, MSV "re-designs" its system accordingly with a confidential "patent pending" technique and seeks to wish away the problem. Of course, the fact that a patent application may be pending is meaningless---it tells us *nothing* probative about the subject technology, or the feasibility of deploying it to resolve the issue at hand.

MSV has once again failed to substantively respond to Inmarsat's argument. The Commission should recognize MSV's hand-waving for what it is and disregard MSV's claims unless and until they can be clearly articulated and shown to be a technically possible way in which MSV could operate its proposed ATC system in practice. Therefore the main points of Inmarsat's previous analysis still stand uncontested on the record: (1) MSV's use of average gain contours is inappropriate, (2) the use of the *effective* -10 dB contours would result in MSV requiring access to additional L-band spectrum for ATC (beyond what MSV needs for MSS-only service) in most of the MSV service area, and (3) 10 dB of discrimination in the MSV system is grossly insufficient to prevent unacceptable self-interference into MSV's own satellite.[21]

Secondly, MSV makes a conclusory statement that beam scan aberration effects are not an issue and that Inmarsat has exaggerated these effects.[22] Inmarsat presented a completely defined scenario describing this phenomenon, detailing the position of the assumed antenna boresight and of the off-boresight beam under consideration and showed the distortion that results.[23] MSV has provided no new facts or arguments, and has certainly not explained at all why it thinks that Inmarsat has exaggerated these effects or why it thinks these effects are "not meaningful."

Thirdly, MSV states that it will coordinate spectrum based only on its satellite traffic requirements and therefore it takes the risk that its terrestrial system will not be able to gain access to spectrum.[24] This provides absolutely no assurance for Inmarsat or any other L-band user, however. MSV has for the last three years refused to participate in coordination meetings under the Mexico City MoU. MSV continues to

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[20] *See* "MSV is Unable to Operate ATC Without Using Additional Spectrum Beyond That Used for Its MSS System" at §3, *ex parte* presentation of Inmarsat, IB Docket No. 01-185, File No. SAT-ASG-20010302-00017 *et al.* (filed May 21, 2002).

[21] *See id.* at § 4.1.

[22] *See Further Technical Analysis* at 6.

[23] *See* "MSV is Unable to Operate ATC Without Using Additional Spectrum Beyond That Used for Its MSS System" at §6.1, *ex parte* presentation of Inmarsat, IB Docket No. 01-185, File No. SAT-ASG-20010302-00017 *et al.* (filed May 21, 2002).

[24] *See Further Technical Analysis* at 6.

retain access to L-band spectrum that they do not need to carry satellite traffic. MSV's assurance that it will only coordinate spectrum for its satellite traffic therefore rings hollow. During the pendency of this proceeding, MSV has every incentive to either continue to obstruct the MoU process or participate in the process under false pretences to attempt to coordinate satellite spectrum for its terrestrial use.

IV. Infeasibility of Monitoring Aggregate Terrestrial Emissions at the Satellite.

In Inmarsat's May 15, 2002 ex parte, several reasons are given why the monitoring system proposed by MSV would not work, and these reasons were described in full technical detail.[25] MSV has provided absolutely no response to the detailed points made by Inmarsat in that technical paper. Instead, MSV makes a few general observations by which it hopes to dismiss Inmarsat's analysis. Those MSV assertions are addressed below in turn:

- MSV claims that, because it has only 10 dB of antenna discrimination towards the ATC interferors, as compared to 20 dB antenna discrimination for Inmarsat, then ATC interference must, according to MSV, be detected earlier by MSV than by Inmarsat.[26]

This simply is not the case. The geographic area over which the MSV beams have an average discrimination of 10 dB is limited to only the area immediately adjacent to the wanted satellite uplink beam. By contrast the area over which the Inmarsat -20 dB sidelobes extend is vastly greater (see Figure 1 above), so many more ATC interferors will be received by Inmarsat at the 20 dB discrimination level than by MSV at the 10 dB discrimination level. It is the product of the sidelobe level and the number of interferors captured at that sidelobe level that determines the aggregate interference.

- MSV states that there will be less interference to victim satellites at lower elevation angles.[27]

This assertion is baseless for the reasons Inmarsat has described on numerous occasions before. In the case where a relatively small number of ATC mobile transmitters would cause harmful interference to Inmarsat, it cannot be assumed that the lower elevation signal path will be subject to increased attenuation due to blockage.[28] The dominant effect, in many metropolitan situations, is the azimuth pointing directions, and not necessarily elevation.[29] And the fundamental issue for ATC remains that the amount of blockage available on the ground for ATC mobile

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[25] *See* "Inmarsat Response to MSV Ex Parte of March 28 Concerning 'Monitoring and Control of Ancillary Terrestrial Emissions by MSV's Space Segment,'" *ex parte* presentation of Inmarsat, IB Docket No. 01-185, File No. SAT-ASG-20010302-00017 *et al.* (filed May 15, 2002).

[26] *See Further Technical Analysis* at 7.

[27] *See Further Technical Analysis* at 9-10.

[28] *See Technical Annex to Comments of Inmarsat Ventures plc*, IB Docket No. 01-185 (filed October 19, 2001); *Supplemental Technical Annex to Reply Comments of Inmarsat Ventures plc*, IB Docket No. 01-185 (filed November 13, 2001); *Ex parte* presentation of Inmarsat, IB Docket No. 01-185, File No. SAT-ASG-20010302-00017 *et al.* (filed February 26, 2002).

[29] *See* Julius Goldhirsh and Wolfhard J. Vogel *'Handbook of Propagation Effects for Vehicular and Personal Mobile Satellite Systems'* NASA Reference Publication 1274 (2nd ed.).

uplinks will be negligible for large proportions of the time.[30] Thus, ATC deployment in the L-band would prevent Inmarsat or any other MSS operator from maintaining the availability of its communications links at normal commercial standards.

- MSV makes a qualitative argument that if the interfering signals are too small to measure then they must be too small to cause interference to Inmarsat.[31]

Inmarsat's comments concerning the proposed MSV monitoring system were limited to responding to the proposed monitoring system as described by MSV.[32] That system, as proposed by MSV, was intended to measure interference at the level where it was degrading MSV's own satellite uplink by 0.25 dB (a figure that correlates with standard ITU interference criteria). As shown by Inmarsat, the proposed MSV monitoring system cannot reliably measure the interference at such low levels.[33] MSV has not disputed this fact, although MSV has implied, yet again, that it cannot disclose how its proposed technology would work because it is based on a proprietary (patent pending) technique.[34] Again, the Commission has no basis to even consider MSV's assertions unless and until MSV explains to the Commission and the parties to this proceeding how its proposed technique would work.

- MSV states that it will measure the ATC interference when the satellite signals in the victim (central) beam are not present, and suggests that this therefore solves the problem Inmarsat has raised about MSV's monitoring system not being sensitive enough to perform its intended function.[35]

This MSV argument is a "red herring". Firstly, in its analysis, Inmarsat assumed that there would be no satellite signal present in the central beam when it demonstrated why the proposed MSV monitoring system is not sensitive enough to provide any meaningful results.[36] Inmarsat then went on to show the further reductions in the sensitivity of the monitoring system if it were assumed that satellite signals were

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30 *See Technical Annex to Comments of Inmarsat Ventures plc*, IB Docket No. 01-185 (filed October 19, 2001); *Supplemental Technical Annex to Reply Comments of Inmarsat Ventures plc*, IB Docket No. 01-185 (filed November 13, 2001); *Ex parte* presentation of Inmarsat, IB Docket No. 01-185, File No. SAT-ASG-20010302-00017 *et al.* (filed February 26, 2002).

31 *See Further Technical Analysis* at 8.

32 *See* "Inmarsat Response to MSV Ex Parte of March 28 Concerning 'Monitoring and Control of Ancillary Terrestrial Emissions by MSV's Space Segment,'" *ex parte* presentation of Inmarsat, IB Docket No. 01-185, File No. SAT-ASG-20010302-00017 *et al.* (filed May 15, 2002).

33 *See id.*

34 *See Further Technical Analysis* at 8.

35 *See id.*

36 *See* "Inmarsat Response to MSV Ex Parte of March 28 Concerning 'Monitoring and Control of Ancillary Terrestrial Emissions by MSV's Space Segment,'" *ex parte* presentation of Inmarsat, IB Docket No. 01-185, File No. SAT-ASG-20010302-00017 *et al.* (filed May 15, 2002).

present in that central beam.[37] MSV is apparently now committing to monitoring interference only when there are no satellite signals present. In this case, Inmarsat's analysis why the proposed MSV monitoring system is not sensitive enough to operate remains valid and uncontested.

- MSV claims that it can determine the antenna discrimination by measuring satellite transmissions at its ATC base stations.[38]

It is questionable whether the transmit and receive performance of the proposed MSV satellite antenna will be identical enough to allow important conclusions about the satellite receive antenna discrimination to be made from measurements of the satellite transmissions. Nevertheless, even if this could be done satisfactorily, it does not solve (i) the fundamental shortcomings of the proposed MSV monitoring system, or (ii) the inability of MSV's ATC system to operate without requiring access to additional L-band spectrum during international satellite system coordination.

- MSV suggests that it will be able to *control* the antenna discrimination of its spot beams so as to adjust the level towards the various metropolitan areas where significant ATC service is offered.[39]

It is encouraging that MSV now acknowledges that there are fundamental problems caused by assuming the average antenna discrimination value of 10 dB, and that in fact the worst case antenna discrimination is really the parameter that will determine what is possible and what is not in the way of ATC operation. MSV's panacea for this problem appears to be a remarkable satellite antenna which can be programmed by ground command to adjust the sidelobe levels to be always –10 dB wherever a key metropolitan area occurs in the service area. Again, MSV is short on technical information here, and there is nothing in the pending MSV replacement satellite application to suggest that the MSV satellite antenna is capable of satisfying this new ATC system requirement, while still performing the primary reconfiguration functions described in the application. All the signs are that this is a new requirement, now deemed "necessary" by MSV to rebut Inmarsat's analysis, but which was not considered at the time MSV prepared its FCC application. It is highly questionable whether such an antenna, capable of solving all the problems of the ATC system, is even feasible. And even if it were, no details have been provided to substantiate such a claim, and no such antenna has been formally proposed.

- MSV repeats its argument that interference will be inherently higher in the direction of the MSV satellite than in the direction of the Inmarsat satellite.[40]

MSV again fails to present any evidence to support this assertion. By contrast Inmarsat has provided clear and uncontested evidence of propagation studies

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[37] *Id.*

[38] *See Further Technical Analysis* at 9. This issue is not directly related to the monitoring of interference (the topic of this section), but we have addressed it here because this is the section in which it was introduced by MSV in its *ex parte*.

[39] *See Further Technical Analysis* at 9.

[40] *See Further Technical Analysis* at 7.

demonstrating the low levels of signal blockage that will occur in metropolitan areas when main streets align with the satellite azimuth direction.[41] In addition Inmarsat has shown some sample city street maps that demonstrate that, in real life, such main streets can align with the azimuth direction of an Inmarsat satellite.[42] In these situations the blockage to Inmarsat indisputably will be less than the blockage to the MSV satellite. Thus, any monitoring of interference by the MSV satellite cannot accurately predict what the interference levels will be at the Inmarsat satellites.

Inmarsat Ventures plc

By: Jonas Eneberg
Manager, Spectrum
9 September, 2002

[41] *See Supplemental Technical Annex to Reply Comments of Inmarsat Ventures plc*, IB Docket No. 01-185 (filed November 13, 2001); *Ex parte* presentation of Inmarsat, IB Docket No. 01-185, File No. SAT-ASG-20010302-00017 *et al.* (filed February 26, 2002).

[42] *See* "Inmarsat Response to MSV Ex Parte of March 28 Concerning 'Monitoring and Control of Ancillary Terrestrial Emissions by MSV's Space Segment,'" *ex parte* presentation of Inmarsat, IB Docket No. 01-185, File No. SAT-ASG-20010302-00017 *et al.* (filed May 15, 2002) at § 4 and Annex 1.